Journal of Sustainable Finance & Investment

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/tsfi20

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To cite this article: Arshad Hasan, Khaled Hussainey & Doaa Aly (2021): Determinants of sustainability reporting decision: evidence from Pakistan, Journal of Sustainable Finance & Investment, DOI: 10.1080/20430795.2021.1964813

To link to this article: https://doi.org/10.1080/20430795.2021.1964813

Published online: 18 Nov 2021.

JOURNAL OF SUSTAINABLE FINANCE & INVESTMENT
https://doi.org/10.1080/20430795.2021.1964813

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Determinants of sustainability reporting decision: evidence from Pakistan

Arshad Hasan[a], Khaled Hussainey [b] and Doaa Aly[c]

[a]Lahore School of Economics, Lahore, Pakistan; [b]Faculty of Business, University of Portsmouth, Portsmouth, UK; [c]School of Business, University of Gloucestershire, Cheltenham, UK

ABSTRACT

We investigate the determinants of corporate sustainability reporting decision. We use a logistic regression model to analyse data collected from a sample of 138 firms listed on the Pakistan Stock Exchange for the years 2009–2018. We find that firms with more gender-diverse boards, larger audit committees and higher institutional ownership are more likely to issue sustainability reports. We also find that concentrated ownership, managerial ownership, foreign ownership and audit committee independence negatively influence the firms' sustainability reporting decision. The findings provide valuable insight to Pakistani policymakers by identifying the attributes that require regulatory focus to achieve the public policy objective of sustainable development. We are the first to explore the determinants of sustainability reporting decision in Pakistan. It provides empirical evidence to regulators and policymakers in Pakistan and other emerging markets who have already adopted a governance framework and are considering sustainability reporting in their respective contexts.

ARTICLE HISTORY
Received 16 February 2021
Accepted 3 August 2021

KEYWORDS
Sustainability reporting; voluntary disclosures; corporate governance; stakeholder theory; emerging economy; Pakistan

1. Introduction

Sustainability reporting is being used increasingly by businesses as a powerful mechanism in corporate policy and strategy (Ong and Djajadikerta 2018). It plays an imperative role in providing the tools required to implement the sustainable development goals, drive the investment to sustainable business practices and finance the sustainability outcomes that the world is looking for (Durand, Paugam, and Stolowy 2019). Sustainability reporting covers all areas of economic efficiency, social responsibility, environmental awareness, ethical culture and corporate governance. Governance functions cannot be completed without sustainability as both are influenced by social, environmental, and economic aspects (Hu and Loh 2018). Businesses around the globe are under growing pressure from stakeholders (Hermawan and Gunardi 2019). Sustainability reporting is

CONTACT Khaled Hussainey khaled.hussainey@port.ac.uk Faculty of Business and Law, University of Portsmouth, Room 6.22 Richmond Building, Portland Street, Portsmouth PO1 3DE, UK

used interchangeably with integrated reporting, social reporting or environmental reporting to reflect corporate responsibility towards their stakeholders.

Herda, Taylor, and Winterbotham (2012) report that corporate sustainability disclosures reduce the information asymmetries and uncertainties between a firm and its stakeholders. Sotorrío and Sánchez (2010) advocate that firms from industries with high social and environmental effects voluntarily disclose sustainability information to meet the sector-specific demands of stakeholders. Blasco and King (2017) argue that sustainability practices differ across countries and regions owing to diverse social behaviour and state regulations. Quite a lot of initiatives have been launched to promote corporate sustainability around the globe. The Global Reporting Initiative (GRI), International Integrated Reporting Council (IIRC) and Sustainability Accounting Standards Board (SASB) provide guidance to businesses and governments worldwide to understand and communicate their impact on sustainability issues.

Sustainability reporting is gaining momentum as a voluntary reporting mechanism to enhance business sustainability and relationship with investors and clients to meet the stakeholders' demand for transparency and accountability (Belal and Momin 2009; Hahn and Kühnen 2013; Lourenço and Branco 2013). Evidence suggests that 93% of the top 250 firms in the Global Fortune 500 and 75% of the top 100 firms in 49 countries surveyed, issue sustainability reports (Blasco and King 2017). However, there is a paucity of research on the organisational determinants of corporate sustainability reporting. Most of the prior studies focus on the areas such as the nature and content of sustainability performance based on the companies operating in developed countries (Artiach et al. 2010; Rao and Tilt 2016) with little known about the determinants of sustainability reporting decision. Moreover, the Covid-19 pandemic has made sustainability disclosures more important than ever and investors are interested in the firms, which are focusing on their employees, suppliers and the communities in which they operate (BSR 2020).

Corporate sustainability reporting is drawing attention in emerging economies. The Morgan Stanley Capital International (MSCI), a global provider of stock market indexes, reclassified Pakistan to emerging market index in June 2017 after keeping it on frontier markets for nine years. Pakistan's capital market has social, political, cultural and economic attributes that provide a unique country context to investigate the drivers of corporate sustainability reporting. Pakistan has implemented major structural reforms to improve investment climate and to attract local, regional and foreign direct investments. The state, families and multinationals dominate the corporate landscape (Mahmood, Kouser, and Masud 2019), while its regulatory framework is not robust owing to ineffective enforcement and incapacity to adapt to the changing circumstances (Mirza 2017). Moreover, with 540 listed firms, Pakistan has a handful of reporting on sustainability performance. Therefore, this study aims to empirically examine the determinants of corporate sustainability reporting decision from the context of an emerging market, Pakistan.

The empirical findings suggest that the firms with more gender-diverse boards, larger audit committees and higher institutional ownership are more likely to issue sustainability reports. In addition, concentrated ownership, managerial ownership, foreign ownership and audit committee independence negatively influence the firms' sustainability reporting decision. These findings confirm that the corporate governance structure of a firm facilitates addressing the social and stakeholders' pressure through sustainability reporting.

Using a stakeholder framework, this study makes several principal contributions and extensions to the sustainability and disclosure literature. First, this paper extends the findings of prior studies based on emerging economies in general and Pakistan in particular, which mainly focus on the nature and content of sustainability reporting (Lone, Ali, and Khan 2016; Mahmood, Kouser, and Masud 2019; Masud, Nurunnabi, and Bae 2018; Naseem et al. 2017). Second, it is one of the foremost empirical endeavours to explore the determinants of sustainability reporting decision in Pakistan. Third, the study provides empirical evidence to regulators and policymakers in Pakistan and other emerging markets who have already adopted corporate governance framework and are considering sustainability reporting in their respective contexts. Finally, it investigates a comprehensive set of corporate governance attributes embracing board composition, ownership structure and audit committee, and uses the data collected over a relatively long and recent period.

The rest of this study is structured as follows. Section 2 provides an overview of sustainability reporting in Pakistan. Section 3 critically reviews the relevant literature and develops the research hypotheses. Section 4 describes the research design, data, empirical model and variables. Section 5 illustrates the interpretation, analysis and discussion of the empirical findings. The final section presents the conclusion, including the implications and recommendations for future research.

2. Sustainability reporting in Pakistan

The corporate sector in Pakistan has a tradition of being socially responsible due to its philanthropic contributions and endowments (Masud, Nurunnabi, and Bae 2018). However, only 50 out of 540 listed firms in Pakistan are reporting on sustainability issues as a standalone report (Hongming et al. 2020). The content and methodology of disclosures also vary across companies and sectors. These firms are upgrading labour standards, protecting biodiversity and providing health facilities to local communities (Mahmood, Kouser, and Masud 2019). On the other hand, all these firms are deficient in adhering to their corporate social responsibility (CSR) with respect to anticorruption, workforce representation, gender equality and child labour (Naseem et al. 2017). Corporate sustainability reporting is in its initial stages and developing progressively in Pakistan. Masud, Nurunnabi, and Bae (2018) suggest that corporate social responsibility is the corporate sector's contribution to sustainable development and the firms should link CSR to their competitive advantage.

Sustainability reporting is a matter of concern for the corporate sector in Pakistan to compete in the international market and to attract multinational firms as European markets increasingly reward the firms, which voluntarily report their sustainability performance (Mahmood, Kouser, and Masud 2019). World Wildlife Fund (WWF) and the Association of Chartered Certified Accountants (ACCA) started Environmental Reporting Awards in 2002 to encourage sustainability reporting in Pakistani firms. The Institute of Chartered Accountants of Pakistan (ICAP) and the Institute of Cost and Management Accountants of Pakistan (ICMAP) jointly launched Best Sustainability Report Award in the year 2011 to recognise excellence in sustainability reporting and to create awareness about corporate social responsibility. Cleaner Production Institute (CPI) initiated a Programme for Industrial Sustainable Development (PISD) in collaboration with Royal

Netherlands Embassy to facilitate industrial firms in producing corporate sustainability reports. Some other organisations are also working to promote corporate sustainability reporting in Pakistan, including CSR Pakistan, Asiatic Public Relations (APR), Global Compact Pakistan, Responsible Business Initiative (RBI) and the Pakistan Centre for Philanthropy (PCP). Therefore, the practice of sustainability reporting in Pakistan is largely driven by external forces like other emerging countries (Mahmood, Kouser, and Masud 2019), while the prevalent regulatory and structural environments have resulted in a lack of expectations and pressures from internal stakeholders (Mirza 2017).

Owing to the increase in stakeholders' emphasis on sustainability performance, the regulators have realised the need to establish reporting and disclosure requirements for promoting socially responsible behaviour among the corporate sector. Staying in line with global best practices, the Securities and Exchange Commission of Pakistan (SECP) issued 'Corporate Social Responsibility Order, 2009' and 'Corporate Social Responsibility Voluntary Guidelines, 2013' to make sustainability performance more comparable among the firms operating in Pakistan (Lone, Ali, and Khan 2016). These regulations require the companies to disclose their activities related to community investment, governance practices, product responsibility, work-life balance, safety measures and climate change, as a minimum. The SECP has emphasised the role of firm boards to formulate social responsibility policy in liaison with strategic business decisions to shape Pakistan's future development. An increasing number of firms are now embracing global best practices after meeting the requirements of local legislation. These firms have also started pursuing independent assurance of their sustainability performance. However, corporate sustainability reporting is still a voluntary activity in Pakistan as there is no mandatory requirement for the same and the above regulations only indirectly emphasise the need to report CSR actions.

3. Empirical review and hypotheses

3.1. Theoretical framework

The most frequently cited theory in sustainability reporting and voluntary disclosure studies is the stakeholder theory. Stakeholder theory provides a theoretical framework to explore the determinants of corporate sustainability reporting (Lourenço and Branco 2013). The stakeholders raise various social, economic and environmental demands to achieve the strategic objectives of the firm. The mechanism through which firms address these demands is sustainability reporting (Buallay and Al-Ajmi 2019). This study aims to analyse the factors that influence a firm's decision to issue a corporate sustainability report. Using a stakeholder framework, a number of hypotheses are developed that relate the corporate governance practices of firms to their sustainability reporting decision.

The stakeholder concept is divided into a corporate planning model and a corporate social responsibility model (Freeman and Dmytriyev 2017). The corporate planning model emphasises the endorsement of corporate strategic decisions by various groups who are imperative for the continued existence of a firm and include owners, creditors, suppliers, employees, customers (Artiach et al. 2010). This model is based on the fundamental proposition of stakeholder theory that the success of a firm is subject to effective

management of dynamic and complex relationships with its stakeholders. This stream of stakeholder concept also addresses the conflicting interests of diverse corporate stakeholders (Saleh, Zulkifli, and Muhamad 2010). On the other hand, the corporate social responsibility model supplements the corporate planning model to incorporate external influences adversarial to the firm and include regulators or social interest groups (Freeman and Dmytriyev 2017). It leads to the development of a corporate strategic plan in conformance with corporate social responsibility.

In the context of Pakistan, the corporate planning model offers incentives, while the corporate social responsibility model provides moral support to implement sustainable practices. Hence, there are incentives for the Pakistani firms to invest in social and sustainability activities as these investments uphold their competitiveness (Mirza 2017). From the stakeholder perspective, investors could view the firms issuing sustainability reports as being a superior match with their environment, and consequently, their investment risk is lower in the long-term (Mahmood, Kouser, and Masud 2019). The extant literature indicates that stakeholder power is related to corporate sustainability performance (Buallay and Al-Ajmi 2019; Girella, Rossi, and Zambon 2019). As sustainability reporting is still a voluntary activity in Pakistan, the stakeholder theory offers a practical framework to investigate the determinants of sustainability reporting decision. Moreover, Pakistani firms may undertake CSR initiatives to increase their goodwill and subsequently disclose the sustainability performance information to gain the support of influential corporate stakeholders and to conduct economically viable operations.

3.2. Corporate governance attributes

Stakeholder theory provides a theoretical foundation for investigating the determinants of corporate sustainability reporting. It advocates that corporate governance attributes transform a stockholder centric- into stakeholder-oriented organisation. These governance practices encourage the firm's management to consider broader ethical and social considerations. Evidence suggests that the board of directors, audit committee and stockholders are the key pillars of corporate governance (Cohen, Krishnamoorthy, and Wright 2004; Hemraj 2003). Therefore, the attributes that will be discussed include board composition, ownership structure and audit committee.

3.2.1. Board composition

Board composition plays an important role in setting the direction of a firm and balancing the competing demands of its stakeholders (Sarhan and Ntim 2019). Alnabsha et al. (2018) advocate that board size has a positive impact on the effectiveness of a firms' oversight function and the level of corporate disclosures. It strengthens the decision-making capacity of a firm and improves the information processing capability (Alotaibi and Hussainey 2016). In the context of Pakistan, Lone, Ali, and Khan (2016) and Naseem et al. (2017) contend that board size is positively related to the level of CSR disclosures, while Mahmood et al. (2018) argue that it has no impact on sustainability disclosure practices. However, evidence also suggests that board size is negatively associated with corporate sustainability reporting due to coordination issues in the decision-making process (Amran, Lee, and Devi 2014; Kiliç, Kuzey, and Uyar 2015). A larger board can take a broader perspective given the opinions and experiences of all stakeholders, which leads to more

voluntary information disclosures (Frias-Aceituno, Rodriguez-Ariza, and Garcia-Sanchez 2013). In addition, a larger board is more likely to represent a diverse group of stakeholders who encourage the firm to engage in CSR practices (Girella, Rossi, and Zambon 2019). A larger board strengthens the relationship with the community, influences the firm to react positively to social pressure and increases the probability of producing a sustainability report (Coffie, Aboagye-Otchere, and Musah 2018). Therefore, based on the stakeholder theory, the following hypothesis is proposed:

H1: Firms with larger boards have a higher likelihood of issuing a sustainability report.

Board independence is a corporate governance mechanism to safeguard the interests of all stakeholders (Ong and Djajadikerta 2018). As independent directors are not associated with management, they can push the firms for voluntary informative disclosures (Hu and Loh 2018; Lone, Ali, and Khan 2016). Masud, Nurunnabi, and Bae (2018) contend that Pakistani firms with a higher fraction of independent directors are more concerned about accountability, transparency and corporate sustainability. Empirical literature also provides some conflicting results in the Saudi Arabian and Pakistani settings suggesting that board independence is negatively linked to CSR disclosure practices (Alotaibi and Hussainey 2016; Mahmood et al. 2018). Naseem et al. (2017) advocate that independent directors facilitate in the integration of corporate social responsibility into organisational policies, which strengthens the related disclosure practices in Pakistan. Likewise, Khan, Muttakin, and Siddiqui (2013) report that the presence of outside independent directors on a firm's board has a positive impact on the extent of CSR disclosures. Herda, Taylor, and Winterbotham (2012) argue that board independence positively influences the firm's voluntary reporting decision and increases the probability of publishing a standalone sustainability report. Considering the above discussion and stakeholder perspective, the following hypothesis is predicted:

H2: Firms with more independent boards have a higher likelihood of issuing a sustainability report.

The empirical literature suggests that the presence of female directors develops board effectiveness, corporate philanthropy and sustainability reporting practices (Ong and Djajadikerta 2018). Matuszak, Różańska, and Macuda (2019) advocate that gender-diverse boards are more concerned about social and environmental protection, working conditions and customer relationships. Sarhan and Ntim (2019) contend that a gender diverse board strengthens the bond between a firm and its external environment that helps to build the trust of all stakeholders. Khan, Khan, and Saeed (2019) and Lone, Ali, and Khan 2016 document that board gender diversity has a positive influence on CSR disclosures in Pakistan, while Majeed, Aziz, and Saleem (2015) find a negative association in this respect. Moreover, women directors exhibit greater responsibility and seek more voluntary information, which improves the decision-making process and the extent of CSR disclosure (Rao and Tilt 2016). Frias-Aceituno, Rodriguez-Ariza, and Garcia-Sanchez (2013) conclude that board gender diversity performs a vital role in the dissemination of integrated corporate sustainability reporting and stakeholder engagement. Abad et al. (2017) argue that board gender diversity has a significant positive impact on corporate sustainability reporting decision. Given this theoretical debate, the following hypothesis is formulated:

H3: Firms with more gender-diverse boards have a higher likelihood of issuing a sustainability report.

The frequency of meetings represents the efforts made by board members and so is the benchmark of board activities (Liao, Lin, and Zhang 2018). Board meeting is the core communication channel through which directors acquire corporate information to execute their monitoring obligation (Alotaibi and Hussainey 2016). Alnabsha et al. (2018) provide that more frequent board meetings signal increased board vigilance, which requires more voluntary disclosures to handle the operations effectively. Naseem et al. (2017) argue that corporate boards in Pakistan that meet frequently are more likely to require disclosure of CSR information to safeguard the interests of all stakeholders. On the other hand, prior studies advocate that boards in weak governance regimes meet more frequently to resolve business problems rather than to execute their corporate responsibilities (Iraya, Mwangi, and Wanjohi 2014; Johl, Kaur, and Cooper 2015). Khan, Khan, and Saeed (2019) document that the frequency of board meetings is not associated with sustainability disclosures in Pakistan. Shrivastava and Addas (2014) contend that board meeting frequency predicts a firm's environmental, social and governance performance as these boards are more disciplined. Hu and Loh (2018) suggest that the frequency of board meetings has a positive impact on sustainability reporting decision as directors find time to discuss the stakeholder engagement strategies and corporate sustainability practices owing to more interactions. Hence, the following hypothesis is proposed:

H4: Firms with more frequent board meetings have a higher likelihood of issuing a sustainability report.

3.2.2. Ownership structure

Masud, Nurunnabi, and Bae (2018) advocate that ownership structure influences corporate sustainability reporting in South Asian countries. Evidence suggests that the firms with concentrated ownership are less motivated to disclose more voluntary information because the demand for public disclosure is relatively weak (Kolsi 2017; Sartawi, Hindawi, and Bsoul 2014). Sánchez, Sotorrío, and Díez (2011) provide that companies are more interested in social, environmental and governance issues when the ownership is less concentrated. Kiliç, Kuzey, and Uyar (2015) argue that the issues of public accountability and social responsibility become less important if the ownership is concentrated, as these firms are not owned by the public at large. However, Iraya, Mwangi, and Wanjohi (2014) contend that concentrated holdings have a positive impact on corporate disclosure practices in Kenya. Coffie, Aboagye-Otchere, and Musah (2018) and Majeed, Aziz, and Saleem (2015) indicate that ownership concentration is positively associated with CSR disclosures in Ghana and Pakistan respectively. Stakeholder theory suggests that the firms with concentrated ownership do not react positively to social pressure, which negatively affects their corporate sustainability performance (Lourenço and Branco 2013). Muttakin and Khan (2014) find that ownership concentration is negatively associated with corporate social responsibility disclosure practices. Mahmood, Kouser, and Masud (2019) document that concentrated ownership has a negative influence on corporate sustainability reporting in Pakistan. Based on the

above empirical debate and stakeholder perspective, the following hypothesis is predicted:

H5: Firms with more ownership concentration have a lower likelihood of issuing a sustainability report.

Institutional investors consider the environmental, social and governance performance of a firm as a preferred attribute in their investment decision (Saleh, Zulkifli, and Muhamad 2010). Unlike other shareholders, they usually take long-term positions and are more attentive to a firm's strategic decisions regarding its sustainability policies and strategies (Harjoto and Jo 2011). Empirical literature contends that institutional ownership is positively associated with the level of sustainability disclosures in Pakistan (Masud, Nurunnabi, and Bae 2018; Majeed, Aziz, and Saleem 2015). However, some studies find that increase in institutional ownership strengthens the association between institutional investors and managers, which makes their effectiveness redundant and has a detrimental impact on CSR (Kolsi 2017; Oh, Cha, and Chang 2017). Boone and White (2015) argue that the presence of institutional investors encourages a firm to report more voluntary information because they believe low disclosure may increase the investment risks. Soliman, El Din, and Sakr (2013) advocate that institutional investors are concerned about corporate sustainability as it builds long-term reputation and mitigates pressures from external activist groups. Considering these academic arguments, the related hypothesis is stated as follows:

H6: Firms with more institutional ownership have a higher likelihood of issuing a sustainability report.

Managerial ownership facilitates the managers to determine strategies with respect to corporate social behaviour and as a result influences the corporate reporting practices (Alotaibi and Hussainey 2016). González and García-Meca (2014) contend that managerial ownership in Latin American markets has a positive impact on corporate disclosure practices if the fraction of stock owned by managers is not very high. However, managers with a high stake in the firm do not invest in socially responsible practices as the costs of these endeavours may outweigh the likely benefits and may reduce the stock value (Khan, Muttakin, and Siddiqui 2013). Moreover, an increase in managerial ownership makes them more powerful than the stakeholders, triggers self-seeking behaviour and reluctance to engage in social initiatives (Oh, Cha, and Chang 2017). Evidence suggests that managerial ownership is negatively linked to corporate sustainability reporting as these firms have less public accountability (Faller and zu Knyphausen-Aufseß 2018). Sarhan and Ntim (2019) argue that companies with lower managerial ownership, invest more in CSR activities and related disclosures to build stakeholders' confidence. Masud, Nurunnabi, and Bae (2018) posit that as directors own more shares in South Asian countries (Pakistan, India and Bangladesh), they become less motivated to provide corporate sustainability information because it negatively affects their compensation and benefits. Based on this discussion, the following hypothesis is proposed:

H7: Firms with more managerial ownership have a lower likelihood of issuing a sustainability report.

Stakeholder theory provides that foreign investors encourage management to invest in socially responsible projects and disclose all related information to address the demands of stakeholders (Faller and zu Knyphausen-Aufseß 2018; Khan, Muttakin, and Siddiqui 2013). Sartawi, Hindawi, and Bsoul (2014) contend that the presence of foreign investors significantly influences the corporate information processing mechanism and increases the level of voluntary disclosures. Coffie, Aboagye-Otchere, and Musah (2018) argue that international operations of a firm diversify its ownership structure and facilitates the formulation, implementation and reporting of ethical business principles. However, some researchers also suggest that foreign ownership is negatively related to corporate social responsibility performance, as these investors are concerned more in financial performance and stock returns, while less in monitoring and corporate policies (Liao, Lin, and Zhang 2018; Matuszak, Różańska, and Macuda 2019; McGuinness, Vieito, and Wang 2017). Kolsi (2017) documents that the information demand is higher from foreign investors owing to the geographical separation between management and owners. Masud, Nurunnabi, and Bae (2018) document that foreign ownership has a positive impact on the extent of corporate social responsibility disclosures in Pakistan, India and Bangladesh as firms use these disclosures as a proactive strategy to obtain continued inflow of capital and to pacify ethical investors. The discussion leads to the following hypothesis:

> H8: Firms with more foreign ownership have a higher likelihood of issuing a sustainability report.

3.2.3. Audit committee

The audit committee is a fundamental tool of corporate boards to implement efficient decision control, information processing and oversight mechanism (Al-Shaer and Zaman 2018). The size of an audit committee strengthens its capacity, knowledge base and adds credibility to the corporate reporting practices (Alotaibi and Hussainey 2016). A larger audit committee has a diversity of expertise, experiences and views, which improves the stakeholders' confidence and sustainability performance (Buallay and AlDhaen 2018). In addition, audit committee size has a positive impact on the level of corporate social responsibility disclosures because a larger committee is more likely to discover and resolve the issues and dilemmas in the reporting process (Appuhami and Tashakor 2017). Musallam (2018) argues that a larger audit committee is positively linked to corporate social behaviour and reporting as committee assignments are spread across sufficient members with distinct opinions, backgrounds and interests. Khan, Khan, and Saeed (2019) contend that an increase in audit committee size strengthens its capacity to facilitate the Pakistani firms in providing more information and improves the quality of CSR disclosures. Buallay and Al-Ajmi (2019) find that larger audit committees are more effective in monitoring and improving the extent of corporate sustainability reporting practices. Considering these empirical arguments, the following hypothesis is formulated:

> H9: Firms with larger audit committees have a higher likelihood of issuing a sustainability report.

The presence of independent directors on an audit committee strengthens its oversight function and safeguards the interests of all stakeholders (Buallay and AlDhaen 2018).

Independent audit committees are more effective in ensuring the credibility of corporate reporting practices since these are free from management influence (Al-Shaer and Zaman 2018). The independent committees are more likely to exercise their authority over the management in requiring more informative disclosures and questioning managers' actions and policies when necessary (Buallay and Al-Ajmi 2019). However, Alotaibi and Hussainey (2016) contend that audit committee independence is negatively associated with corporate social responsibility disclosures. Woidtke and Yeh (2013) argue that audit committees are effective when they are entirely independent. On the other hand, Herda, Taylor, and Winterbotham (2012) provide that independent directors encourage a firm to issue a corporate sustainability report as their presence signals accountability, transparency and commitment to sustainability. Independent members of an audit committee improve the effectiveness of its monitoring mechanism and facilitate the integration of social responsibility into the corporate reporting process, which strengthens the related disclosure practices (Appuhami and Tashakor 2017). Khan, Khan, and Saeed (2019) advocate that audit committee independence has a positive impact on the quality of CSR disclosures in Pakistan. Given this theoretical and empirical debate, the following hypothesis is developed:

H10: Firms with more independent audit committees have a higher likelihood of issuing a sustainability report.

4. Research design

The population of this study consists of the firms listed on the Pakistan Stock Exchange (PSX). The financial firms are excluded due to their unique accounting practices (Alotaibi and Hussainey 2016). The availability of data has restricted our time horizon to 10 years from 2009 to 2018 and a final sample of 1380 firm-year observations, comprising 138 non-financial firms, Table 1 presents the sample distribution across industries. Adopting within the overall framework of quantitative research strategy, a secondary method of data collection is used in this study. Corporate governance data are manually collected from the annual reports available on the websites of the selected firms, while financial data are extracted from the OSIRIS database.

After collecting the necessary data, univariate analysis is performed based on descriptive statistics and comparison tests. A parametric t-test and non-parametric Wilcoxon rank-

Table 1. Sample composition by industry.

		Leading Firms		Conventional Firms		All Firms	
Industry		*n*	%	*n*	%	*n*	%
Oil and Gas	(IND_OIL)	3	13%	9	8%	12	9%
Technology and Communication	(IND_TECH)	3	13%	11	10%	14	10%
Power and Utilities	(IND_POW)	2	9%	6	5%	8	6%
Chemical and Fertiliser	(IND_CHEM)	7	30%	12	10%	19	14%
Construction and Property	(IND_CONS)	1	4%	10	9%	11	8%
Food and Personal Care	(IND_CARE)	1	4%	16	14%	17	12%
Textile and Household	(IND_TEX)	0	0%	25	22%	25	18%
Pharma and Packaging	(IND_PHAR)	4	17%	14	12%	18	13%
Travel and Auto	(IND_AUTO)	2	9%	12	10%	14	10%
		23	100%	115	100%	138	100%

sum (Mann–Whitney) test are conducted to statistically compare the equality of means for continuous variables, while the test of equality of proportions is used in the case of binary variables. The significance of this research is tested using the logistic regression model. The underlying assumptions in the regression model are tested for multicollinearity based on the correlation matrix, Variance Inflation Factor (VIF) and Tolerance. Logistic regression is employed in this study due to the dichotomous nature of the dependent variable – the firm has either issued a voluntary sustainability report or not otherwise. This form of regression is more robust by design as it overcomes the restrictive assumptions of linearity, normality and equal variances. Logistic regression can predict the best possible value for each coefficient in the model. Finally, the logistic regression is validated by Hosmer-Lemeshow Test and Likelihood Ratio Chi-square (LR Chi2) (Girella, Rossi, and Zambon 2019; Gujarati and Porter 2009; Meurer and Tolles 2017).

The following logistic regression equation is proposed to test the hypotheses:

$$\begin{aligned} SRD\_it = {} & \beta\_0 + \beta\_1\, BSIZE\_it + \beta\_2\, BIND\_it + \beta\_3\, BDIV\_it \\ & + \beta\_4\, BMEET\_it + \beta\_5\, COWN\_it + \beta\_6\, IOWN\_it + \beta\_7\, MOWN\_it \\ & + \beta\_8\, FOWN\_it + \beta\_9\, AUDSIZ\_it + \beta\_10\, AUDIND\_it + \beta\_11\, BIG4\_it \\ & + \beta\_12\, SIZE\_it + \beta\_13\, ROA\_it + \beta\_14\, LQ\_it + \beta\_15\, FCF\_it \\ & + \beta\_16\, LEV\_it + \beta\_17\, MTB\_it + \beta\_18\, DIV\_it + \beta\_19\, AGE\_it \\ & + \beta\_20\, EMP\_it + \beta\_21\, SUB\_it + \beta\_22j\, IND\_it + \varepsilon\_it \end{aligned} \quad (1)$$

All variables and their measures are described in Table 2. i is the individual firm, t represents the time period, β is the estimated parameter, j represents the firms' industry ($j = 1,2,3,4$), while ε is the error term. The study controls for firm-specific characteristics that have been identified in empirical literature as determinants of corporate sustainability reporting decision (Artiach et al. 2010; Kim et al. 2018; Muttakin and Khan 2014). The study also control for the industry effect using industry control variables (Appuhami and Tashakor 2017; Herda, Taylor, and Winterbotham 2012; Lourenço and Branco 2013).

5. Results and discussion

5.1. Univariate analysis

Table 3 provides the univariate analysis represented by descriptive statistics and comparison tests for all the variables from 2009 to 2018. The sample firms are divided into two groups on the basis of whether a corporate sustainability report has been issued by the respective firm or not. It generates a subsample of 23 leading firms, which have voluntarily issued corporate sustainability reports and a subsample of 115 conventional firms. The descriptive statistics exhibit the mean, standard deviation, minimum and maximum values, while comparison tests identify the differences in mean values between the leading and conventional firms for corporate governance and control variables. For continuous variables, the parametric t-tests identify significant differences in mean values and the non-parametric Wilcoxon rank-sum (Mann–Whitney) tests highlight the significant differences in mean rank values, while a test of proportions focuses on the significant differences in mean values for binary variables.

Table 2. Definition of variables.

Variable	Definition	Pred Sign	Measure	Key Reference
Dependent Variable				
SRD	Sustainability Reporting Decision		A dummy variable, takes 1 if the firm issues a sustainability report, otherwise 0.	Herda, Taylor, and Winterbotham (2012), Hu and Loh (2018)
Independent Variables				
BSIZE	Board Size	+	Total number of directors on the board.	Coffie, Aboagye-Otchere, and Musah (2018), Girella, Rossi, and Zambon (2019)
BIND	Board Independence	+	Proportion of independent directors to total board members.	Khan, Muttakin, and Siddiqui (2013), Ong and Djajadikerta (2018)
BGD	Board Gender Diversity	+	Proportion of female directors to total board members.	Abad et al. (2017), Sarhan and Ntim (2019)
BMEET	Board Meetings	+	Number of board meetings held during the financial year.	Alnabsha et al. (2018), Hu and Loh (2018)
COWN	Ownership Concentration	–	Percentage of total shares outstanding belonging to block holders having 5% or more shares.	Lourenço and Branco (2013), Kiliç, Kuzey, and Uyar (2015)
IOWN	Institutional Ownership	+	Percentage of total shares held by institutional investors.	Boone and White (2015), Soliman, El Din, and Sakr (2013)
MOWN	Managerial Ownership	–	Percentage of total shares belonging to the board of directors.	Faller and zu Knyphausen-Aufseß (2018), Oh, Cha, and Chang (2017)
FOWN	Foreign Ownership	+	Percentage of total shares outstanding held by foreign investors.	Faller and zu Knyphausen-Aufseß (2018), Kolsi (2017)
AUDS	Audit Committee Size	+	Total number of members serving on the audit committee.	Alotaibi and Hussainey (2016), Appuhami and Tashakor (2017)
AUDI	Audit Committee Independence	+	The fraction of independent audit committee members to audit committee size.	Herda, Taylor, and Winterbotham (2012), Buallay and Al-Ajmi (2019)
Control Variables				
BIG4	Big Four Auditors	+	A dummy variable, takes 1 if the auditor is from big 4, otherwise 0.	Sarhan and Ntim (2019), Alnabsha et al. (2018)
SIZE	Firm Size	+	Natural logarithm of the operating revenues of a firm.	Herda, Taylor, and Winterbotham (2012), Liao, Lin, and Zhang (2018), Oh, Cha, and Chang (2017)
ROA	Firm Performance	+	Ratio of income before tax to total assets.	Muttakin and Khan (2014), Masud, Nurunnabi, and Bae (2018)
LQ	Firm Liquidity	+/–	Ratio of the current assets to current liabilities.	Alotaibi and Hussainey (2016), Herda, Taylor, and Winterbotham (2012)
FCF	Financial Capacity	+/–	Free cash flow of a firm divided by its net sales	Artiach et al. (2010), Okpa et al. (2019)
LEV	Firm Leverage	–	Ratio of a firm's total debt to its total assets.	Herda, Taylor, and Winterbotham (2012), Khan, Muttakin, and Siddiqui (2013)
MTB	Growth Opportunities	+/–	Market value of a firm's equity divided by its book value.	Girella, Rossi, and Zambon (2019), Masud, Nurunnabi, and Bae (2018)
DIV	Dividends	+/–	A dummy variable, takes 1 if the firm paid any dividends, otherwise 0.	Alotaibi and Hussainey (2016), Naseem et al. (2017)
AGE	Firm Age	+/–	Natural logarithm of the number of years a firm operates in the market.	Khan, Muttakin, and Siddiqui (2013), Musallam (2018), Sarhan and Ntim (2019)
EMP	Number of Employees	+/–	Natural logarithm of a firm's total number of employees.	Kim et al. (2018)
SUB	Number of Subsidiaries	+/–	A firm's total number of subsidiaries.	Kim et al. (2018)
IND	Industry	+/–	See Table 1.	Appuhami and Tashakor (2017), Herda, Taylor, and Winterbotham (2012), Lourenço and Branco (2013)

Table 3. Descriptive statistics and comparison tests.

	Leading Firms					Conventional Firms					Comparison Tests	
Variable	N	Mean	S.D.	Min	Max	N	Mean	S.D.	Min	Max	t-stat	z-value
Panel A: Continuous Variables												
BSIZE	230	9.09	2.11	6.00	14.00	1150	8.06	1.60	5.00	17.00	8.47***	8.10***
BIND	230	0.19	0.13	0.00	0.60	1150	0.15	0.12	0.00	0.71	4.07***	3.13***
BGD	230	0.05	0.08	0.00	0.33	1150	0.08	0.13	0.00	0.71	−3.56***	−2.49**
BMEET	230	5.90	2.69	3.00	19.00	1150	5.40	2.04	2.00	19.00	3.17***	2.95***
COWN	230	0.67	0.22	0.14	0.99	1150	0.64	0.18	0.00	0.96	2.46**	3.38***
IOWN	230	0.65	0.26	0.04	0.98	1150	0.39	0.31	0.00	0.98	11.97***	11.60***
MOWN	230	0.01	0.03	0.00	0.12	1150	0.12	0.20	0.00	0.87	−8.17***	−10.66***
FOWN	230	0.30	0.32	0.00	0.98	1150	0.17	0.27	0.00	0.95	6.23***	7.29***
AUDS	230	3.98	1.14	3.00	8.00	1150	3.43	0.70	2.00	7.00	9.64***	7.80***
AUDI	230	0.30	0.20	0.00	1.00	1150	0.29	0.23	0.00	1.00	0.75	0.46
SIZE	230	17.39	1.39	13.61	20.05	1150	15.63	1.91	7.50	20.90	13.28***	13.60***
ROA	230	0.10	0.10	−0.12	0.47	1150	0.08	0.14	−0.60	1.00	2.35**	2.68***
LIQ	230	0.98	0.76	0.17	5.41	1150	1.03	1.14	0.01	8.98	−0.58	2.11**
FCF	230	0.08	0.13	−0.31	0.50	1150	0.06	0.19	−0.73	0.68	0.95	0.88
LEV	230	0.20	0.20	0.00	0.74	1150	0.27	0.24	0.00	1.70	−4.47***	−4.62***
MTB	230	4.00	7.88	0.16	56.27	1150	1.92	3.19	0.04	41.71	6.64***	6.24***
AGE	230	3.70	0.51	1.79	4.65	1150	3.44	0.60	0.69	5.06	6.15***	6.58***
EMP	230	7.27	0.97	5.25	9.42	1150	6.53	1.43	2.89	10.15	7.57***	7.70***
SUB	230	4.78	6.26	0.00	21.00	1150	5.62	12.34	0.00	89.00	−1.00	1.52
Panel B: Binary Variables												
BIG4	230	0.91	0.28	0.00	1.00	1150	0.59	0.49	0.00	1.00		9.35***
DIV	230	0.58	0.49	0.00	1.00	1150	0.50	0.50	0.00	1.00		2.43**

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

The univariate tests indicate that leading firms have larger boards with a mean board size of 9.09 as compared to 8.06 for conventional firms. It is substantiated by comparison tests (t-stat 8.47, z-value 8.10) at the 1% level of significance, thereby providing initial support for hypothesis H1. Similarly, the differences in BIND and BMEET are also statistically significant in support of hypotheses H2 and H4, which suggests that corporate boards of leading firms are more independent and more active than conventional firms. However, univariate analysis reveals that leading firms have lesser women representation and have higher block holdings as compared to conventional firms. In addition, the differences in other ownership attributes are also significant, indicating that the leading firms have greater institutional ownership, lower managerial ownership and a higher level of foreign ownership than the conventional firms. The differences in audit committee factors show that the firms issuing corporate sustainability reports have larger audit committees than the firms not producing these reports. These results provide initial statistical support for the study hypotheses. Moreover, these firms are more likely to be audited by big four auditors, have significantly larger size, higher profitability, lower liquidity and a lesser degree of debt in their capital structure. The leading firms also have more growth opportunities, a higher number of employees, a higher likelihood of paying dividends and are more aged as compared to the conventional firms.

5.2. Bivariate analysis

Table 4 reports the parametric Pearson correlation coefficients and the non-parametric Spearman rank correlations between the sample variables including the dependent, independent and control variables. The correlation matrix indicates that the degree of correlation between the variables is either low or moderate, which signals that collinearity is not likely to be a problem in this study. There is no pairwise correlation coefficient greater than 80% between the independent variables, suggesting that the potential risk of multicollinearity is limited (Gujarati and Porter 2009). Moreover, the results indicate that the VIF statistics for all variables are between 1.128 and 5.587, and none of the variables have a VIF value of more than 10 or a tolerance value of less than 0.10. The highest Pearson correlation (0.735) is observed between BIND and AUDI, which implies that firms with independent boards also have more independent audit committees. The highest Spearman's coefficient of −0.752 between IOWN and MOWN signifies that the presence of institutional investors discourages managerial ownership. The correlation matrix is also used to measure the strength and direction of the linear relationship between two variables. Both the Pearson and Spearman correlation coefficients suggest that sustainability reporting decision is significantly associated with most of the independent and control variables in support of the hypotheses H1, H2, H4, H6, H7, H8 and H9.

5.3. Multivariate analysis

Table 5 reports the logistic regression results by estimating Equation (1) to explore the determinants of corporate sustainability reporting decision from the context of listed firms in Pakistan. The coefficient of BSIZE is −0.008 and is not statistically significant at any level of significance. This result illustrates that board size has no impact on sustainability reporting in Pakistan. A possible explanation is the cultural and political

Table 4. Pearson/Spearman correlation matrix.

	SRD	BSIZE	BIND	BGD	BMEET	COWN	IOWN	MOWN	FOWN	AUDS	AUDI
SRD		0.218***	0.084***	−0.067**	0.079***	0.091***	0.312***	−0.287***	0.196***	0.210***	0.012
BSIZE	0.222***		−0.041	−0.063**	0.158***	−0.055**	0.201***	−0.222***	0.037	0.405***	0.055**
BIND	0.109***	0.107***		−0.092***	0.109***	0.044	0.169***	−0.247***	0.120***	0.107***	0.769***
BGD	−0.095***	−0.099***	−0.138***		−0.056**	−0.058**	−0.291***	0.261***	−0.182***	−0.119***	−0.073***
BMEET	0.085***	0.197***	0.138***	−0.089***		−0.095***	0.016	−0.055**	−0.098***	0.116***	0.089***
COWN	0.066**	−0.072***	0.050*	−0.061**	−0.078***		0.426***	−0.213***	0.308***	−0.051*	0.120***
IOWN	0.307***	0.198***	0.190***	−0.286***	0.024	0.449***		−0.752***	0.549***	0.243***	0.173***
MOWN	−0.215***	−0.148***	−0.175***	0.205***	0.006	0.152***	−0.648***		−0.456***	−0.242***	−0.202***
FOWN	0.166***	−0.033	0.046*	−0.140***	−0.168***	0.381***	0.562***	−0.320***		0.141***	0.094***
AUDS	0.251***	0.479***	0.148***	−0.130***	0.188***	−0.071***	0.230***	−0.221***	0.043		−0.092***
AUDI	0.02	0.084***	0.735***	−0.106***	0.099***	0.122***	0.176***	−0.139***	0.064**	0.004	
BIG4	0.252***	0.265***	0.116***	−0.166***	0.071***	0.048*	0.407***	−0.313***	0.356***	0.312***	0.069**
SIZE	0.337***	0.314***	0.178***	−0.263***	0.209***	0.076***	0.400***	−0.250***	0.196***	0.317***	0.086***
ROA	0.063**	0.121***	0.084***	−0.083***	0.003	0.069**	0.204***	−0.135***	0.223***	0.154***	0.021
LIQ	−0.016	0.066**	0.147***	−0.026	0.108***	−0.004	0.128***	−0.139***	0.074***	0.129***	0.108***
FCF	0.025	0.186***	0.065**	0.001	0.028	0.025	0.158***	−0.112***	0.066**	0.203***	0.005
LEV	−0.120***	−0.125***	−0.096***	0.052*	0.028	−0.110***	−0.326***	0.222***	−0.355***	−0.185***	−0.061**
MTB	0.176***	0.096***	0.055**	−0.041	−0.046*	0.208***	0.227***	−0.122***	0.316***	0.101***	0.050*
DIV	0.065**	0.104***	0.104***	−0.137***	0.068**	−0.072***	0.157***	−0.166***	0.141***	0.141***	0.067**
AGE	0.163***	0.137***	0.154***	−0.122***	0.032	0.023	0.111***	−0.088***	0.150***	0.082***	0.092***
EMP	0.200***	0.201***	0.103***	−0.111***	0.203***	−0.021	0.134***	−0.100***	0.070***	0.238***	0.043
SUB	−0.027	0.047*	−0.029	−0.105***	0.116***	−0.157***	0.004	−0.062**	−0.027	0.075***	−0.052*

	BIG4	SIZE	ROA	LIQ	FCF	LEV	MTB	DIV	AGE	EMP	SUB
SRD	0.252***	0.366***	0.072***	0.057**	0.024	−0.124***	0.168***	0.065**	0.177***	0.207***	0.041
BSIZE	0.262***	0.287***	0.130***	0.141***	0.175***	−0.111***	0.222***	0.109***	0.173***	0.224***	0.155***
BIND	0.101***	0.170***	0.073***	0.089***	0.035	−0.062**	0.176***	0.095***	0.139***	0.029	0.077***
BGD	−0.125***	−0.238***	−0.026	−0.037	0.042	0.063**	−0.036	−0.090***	−0.083***	−0.081***	−0.075***
BMEET	0.102***	0.191***	0.024	0.061**	0.034	0.028	0.042	0.065**	0.009	0.109***	0.247***
COWN	0.049*	0.079***	0.041	−0.029	0.002	−0.184***	0.212***	−0.068**	0.044	−0.006	−0.330***
IOWN	0.418***	0.435***	0.200***	0.237***	0.139***	−0.357***	0.295***	0.173***	0.169***	0.141***	−0.035
MOWN	−0.377***	−0.393***	−0.118***	−0.189***	−0.127***	0.312***	−0.255***	−0.138***	−0.134***	−0.081***	0.022
FOWN	0.416***	0.343***	0.236***	0.208***	0.107***	−0.397***	0.315***	0.184***	0.150***	0.156***	−0.034

(*Continued*)

Table 4. Continued.

	BIG4	SIZE	ROA	LIQ	FCF	LEV	MTB	DIV	AGE	EMP	SUB
AUDS	0.319***	0.295***	0.145***	0.186***	0.201***	−0.175***	0.234***	0.131***	0.086***	0.207***	0.159***
AUDI	0.051*	0.066**	0.022	0.079***	−0.003	−0.073***	0.105***	0.063**	0.132***	−0.024	0.003
BIG4		0.377***	0.316***	0.262***	0.240***	−0.318***	0.352***	0.244***	0.041	0.066**	0.197***
SIZE	0.411***		0.337***	0.171***	0.203***	−0.206***	0.299***	0.380***	0.170***	0.593***	0.285***
ROA	0.304***	0.352***		0.487***	0.441***	−0.504***	0.537***	0.518***	0.111***	0.169***	0.118***
LIQ	0.179***	0.031	0.307***		0.215***	−0.572***	0.267***	0.305***	0.066**	0.021	0.153***
FCF	0.240***	0.335***	0.389***	0.116***		−0.249***	0.268***	0.241***	0.006	0.186***	0.071***
LEV	−0.332***	−0.287***	−0.461***	−0.402***	−0.246***		−0.366***	−0.237***	−0.182***	−0.018	−0.015
MTB	0.175***	0.167***	0.351***	−0.018	0.158***	−0.134***		0.290***	0.138***	0.026	−0.025
DIV	0.244***	0.387***	0.457***	0.164***	0.242***	−0.256***	0.115***		0.141***	0.235***	0.126***
AGE	0.04	0.158***	0.091***	0.021	0.033	−0.206***	0.106***	0.141***		0.306***	0.200***
EMP	0.065**	0.615***	0.166***	−0.014	0.242***	−0.075***	0.084***	0.238***	0.315***		0.291***
SUB	0.033	0.133***	0.095***	0.079***	0.031	−0.065**	−0.032	0.125***	0.095***	0.157***	

Note: Lower-triangular cells report Pearson's correlation coefficients, upper-triangular cells are Spearman's rank correlation.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

environment of developing countries, where board vacancies are filled by personal connections instead of professional competence, which renders these boards ineffective (Khan, Khan, and Saeed 2019; Sarhan and Ntim 2019; Sartawi, Hindawi, and Bsoul 2014). The regression results demonstrate that the association between SRD and BIND is not significant. It provides that the level of board independence is irrelevant to sustainability reporting (Appuhami and Tashakor 2017; Girella, Rossi, and Zambon 2019). The result is also in line with Majeed, Aziz, and Saleem (2015) in Pakistan's context suggesting that independent directors lack focused knowledge about CSR issues. Therefore, H2 is rejected.

BGD is positively associated with SRD at the 10% level of significance implying that firms with more female directors on their boards are more likely to publish standalone sustainability reports. It supports H3 and stakeholder perspective that gender-diverse boards are more concerned about corporate social responsibility and seek more voluntary information, which improves the decision-making process and the disclosure practices (Frias-Aceituno, Rodriguez-Ariza, and Garcia-Sanchez 2013; Lone, Ali, and Khan 2016; Rao and Tilt 2016). In addition, the regression coefficient of SRD on BMEET is −0.018 and is statistically insignificant at any level of significance. It indicates that the sustainability reporting decision of a firm is not related to the frequency of its board meetings. Board meetings are not necessarily useful since routine tasks absorb much of the meetings' time (Alotaibi and Hussainey 2016; Al-Shaer and Zaman 2018; Khan,

Table 5. Logistic regression results.

Variables	Coefficient	Std. Error	Wald Chi2	Significance	Odds Ratio	VIF	Tolerance
Intercept	−22.935	2.124	116.640	0.000***			
BSIZE	−0.008	0.066	0.014	0.905	0.992	1.580	0.633
BIND	−1.231	1.199	1.061	0.305	0.292	3.128	0.320
BGD	1.677	0.907	3.423	0.064*	1.861	1.213	0.825
BMEET	−0.018	0.056	0.109	0.740	0.982	1.209	0.827
COWN	−2.341	1.095	4.580	0.032**	0.096	2.767	0.361
IOWN	3.300	0.981	11.290	0.001***	27.103	5.587	0.179
MOWN	−5.385	2.742	3.842	0.050**	0.005	3.406	0.294
FOWN	−1.501	0.464	10.498	0.001***	0.223	2.098	0.477
AUDSIZ	0.395	0.131	9.120	0.002***	1.485	1.573	0.636
AUDIND	−1.742	0.678	6.605	0.01**	0.175	2.874	0.348
BIG4	0.380	0.345	1.210	0.271	1.462	1.836	0.545
SIZE	1.009	0.126	64.481	0.000***	2.743	4.058	0.246
ROA	−1.864	1.184	2.465	0.115	0.155	2.052	0.487
LIQ	0.020	0.143	0.020	0.891	1.020	1.441	0.694
FCF	−3.565	0.801	19.803	0.000***	0.028	1.354	0.739
LEV	−1.121	0.692	2.624	0.105	0.326	1.866	0.536
MTB	0.055	0.021	6.605	0.010**	1.057	1.393	0.718
DIV	−0.303	0.226	1.796	0.181	0.739	1.455	0.687
AGE	1.059	0.219	23.426	0.000***	2.884	1.370	0.730
EMP	−0.038	0.128	0.090	0.766	0.963	3.061	0.327
SUB	−0.041	0.014	8.468	0.004***	0.959	1.128	0.886
IND_OIL	−0.669	0.519	1.664	0.198	0.512	2.278	0.439
IND_TECH	2.929	0.439	44.489	0.000***	18.707	1.525	0.656
IND_POW	−1.536	0.670	5.244	0.022**	0.215	2.134	0.469
IND_CHEM	2.854	0.430	43.957	0.000***	17.359	1.867	0.536
IND_CONS	1.112	0.509	4.796	0.029**	3.042	1.519	0.658
IND_CARE	0.251	0.550	0.212	0.649	1.285	1.633	0.612
IND_PHAR	2.637	0.407	41.861	0.000***	13.965	1.493	0.670
LR Chi2				533.13***			
Hosmer-Lemeshow Test				7.710			

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Khan, and Saeed 2019). This result is inconsistent with H4 that firms with more frequent board meetings have a higher likelihood of issuing a sustainability report.

The results indicate that the regression coefficient for COWN is negative and statistically significant (coefficient −2.341, $p < 0.05$), which validates the hypothesis H5 that the firm with lower concentrated ownership has a higher likelihood of issuing a sustainability report. These findings are consistent with the stakeholder premise suggesting that the issue of social responsibility and accountability becomes less important if the ownership is concentrated because the demand for public disclosure is relatively weak (Coffie, Aboagye-Otchere, and Musah 2018; Kolsi 2017; Sartawi, Hindawi, and Bsoul 2014). The results are also along the lines of Mahmood, Kouser, and Masud (2019) in Pakistan's context. We also find that MOWN is negatively related to SRD (coefficient −5.385, $p < 0.05$), which justifies H7 and indicates that leading corporate sustainability firms in Pakistan have lower managerial ownership. The results of the parametric t-test and non-parametric Wilcoxon rank-sum (Mann–Whitney) test (Table 3) also provide statistical support to this outcome. Stakeholder theory advocates that an increase in managerial ownership makes the managers more powerful than other stakeholders, triggers self-seeking behaviour and reluctance to engage in social initiatives (Khan, Muttakin, and Siddiqui 2013; Masud, Nurunnabi, and Bae 2018; Oh, Cha, and Chang 2017).

This paper contributes to the ongoing debate about the impact of institutional ownership on voluntary sustainability reporting from the context of Pakistani firms. Table 5 reveals that the coefficient for IOWN is positive and significant (coefficient 3.30, $p < 0.01$), contributing strong support for hypothesis *H6*. The findings are also consistent with the results of Comparison Tests reported in Table 3. Stakeholder theory suggests that the presence of institutional investors encourages the firm to report more voluntary information because these disclosures strengthen the corporate image, long-term reputation and mitigate the pressure from stakeholders (Harjoto and Jo 2011; Soliman, El Din, and Sakr 2013). The results are also consistent with Masud, Nurunnabi, and Bae (2018) in the context of South Asian countries involving Pakistan, India and Bangladesh. The study finds that FOWN is negatively linked to SRD indicating that firms with a higher proportion of foreign ownership are less likely to publish corporate sustainability reports (coefficient −1.501, $p < 0.01$). These findings are not coherent with the expectations of H8, and suggest that foreign investors in Pakistani firms do not protect the interests of all stakeholders. The extant literature provides that foreign ownership in Chinese firms is negatively related to corporate social responsibility performance, as these investors are concerned more in financial performance and stock returns, while less in corporate monitoring and sustainability (Liao, Lin, and Zhang 2018; McGuinness, Vieito, and Wang 2017). Likewise, Matuszak, Różańska, and Macuda (2019) register that foreign investors have less moral attachment and for that reason negatively influence the level of CSR disclosures in Polish firms.

Logistic regression results indicate that AUDS is positively associated with SRD (coefficient 0.395, $p < 0.01$) implying that firms with large audit committees are more likely to issue standalone sustainability reports. The results of the descriptive statistics and comparison tests (Table 3) also provide statistical support to this outcome. It substantiates H9 and stakeholder perspective that larger audit committees have a diverse knowledge base, experiences and views, which improves the

stakeholders' confidence and sustainability performance (Appuhami and Tashakor 2017; Buallay and AlDhaen 2018; Khan, Khan, and Saeed 2019). The study reveals that the regression coefficient for AUDI is negative and significant (coefficient −1.742, $p < 0.05$), which advocates that the firms with more independent audit committees have a lower likelihood of publishing a sustainability report. It is an unexpected outcome, not consistent with the prediction of hypothesis H10. Evidence suggests that audit committee independence is negatively associated with corporate social responsibility disclosures (Alotaibi and Hussainey 2016; Hermawan and Gunardi 2019). In addition, Fodio, Ibikunle, and Oba (2013) using the Nigerian data and Woidtke and Yeh (2013) using the East Asian data contend that audit committees are effective when these are entirely independent, while Table 3 shows that the average independence of audit committees is 30% and 29% respectively for the leading and conventional firms in Pakistan.

Moreover, the logistic regression reveals that firm size (SIZE), growth opportunities (MTB) and firm age (AGE) have a positive impact on the voluntary sustainability reporting decision, which are consistent with the prior studies (Artiach et al. 2010; Dienes, Sassen, and Fischer 2016; Herda, Taylor, and Winterbotham 2012; Muttakin and Khan 2014; Oh, Cha, and Chang 2017). The results also indicate that the firm financial capacity (FCF) and the number of its subsidiaries (SUB) are related negatively to SRD. Previous research on sustainability reporting provides empirical support to these findings (Artiach et al. 2010; Haniffa and Cooke 2002). Table 5 also indicates that firms operating in technology (IND_TECH), chemical (IND_CHEM) and pharma (IND_PHAR) industries are more likely to issue a sustainability report, as their regression coefficients are positive and significant at 1% level. These industry effects are also in line with the results of earlier studies (Ali, Frynas, and Mahmood 2017; Coffie, Aboagye-Otchere, and Musah 2018; Herda, Taylor, and Winterbotham 2012; Muttakin and Khan 2014). The overall findings of the study provide empirical evidence, which suggests that corporate governance attributes, firm characteristics and industry sectors are important determinants of sustainability reporting decision in Pakistan. These results are consistent with the stakeholder perspective.

To assess the validity of the logistic regression model and the accuracy of its predicted outcomes, a number of tests are performed. The Hosmer-Lemeshow goodness-of-fit test measures the differences between the predicted and observed outcomes (Meurer and Tolles 2017). When there is a good agreement, it will not show a statistically significant difference. The p-value of 0.462 ($\chi^2 = 7.71$) indicates that our model is well calibrated. The likelihood ratio chi-square (LR Chi2) is an omnibus test to ensure the perfect suitability of the logistic regression model to the study data (Girella, Rossi, and Zambon 2019). The results ($\chi^2 = 533.13$, p-value = 0.000) suggest that our model fits the data well. Hence, it provides excellent goodness of fit for logistic regression to study the determinants of corporate sustainability reporting. Moreover, VIF and Tolerance statistics for all variables indicate that collinearity does not appear to create a threat to the interpretation of the regression coefficients (Gujarati and Porter 2009).

6. Conclusions

Sustainability reporting is being used increasingly by businesses as a powerful mechanism in corporate policy and strategy. It covers all areas of economic efficiency, social

responsibility, environmental awareness, ethical culture and corporate governance. Corporate sustainability reporting is gaining momentum around the globe as a voluntary reporting mechanism to enhance stakeholders' confidence. However, it is drawing attention in emerging economies. With 540 listed firms, Pakistan has a handful of reporting on sustainability performance. There is a paucity of research on the organisational determinants of corporate sustainability reporting. Using a stakeholder framework, this study aims to empirically examine the determinants of sustainability reporting decision from the perspective of an emerging economy, Pakistan.

Empirical findings support the stakeholder perspective and suggest that the firms with more gender- diverse boards, larger audit committees and higher institutional ownership are more likely to issue sustainability reports. The results provide that concentrated ownership, managerial ownership, foreign ownership and audit committee independence negatively influence the firms' sustainability reporting decision. Overall, the impact of board composition on sustainability reporting decision is weak, it is strong for ownership structure and mixed for audit committee factors. In terms of firm characteristics, size of the firm, financial capacity, growth opportunities and firm age also influence the voluntary reporting decision. Moreover, firms operating in technology, chemical and pharma industries are more likely to issue a sustainability report. These findings suggest that in a disclosure environment with little or no regulation, governance attributes, firm characteristics and industry sectors can predict whether firms issue standalone sustainability reports.

The findings provide valuable insight to the policymakers by identifying the attributes that require regulatory focus to achieve the public policy objective of sustainable development. The study suggests that firms can enhance their sustainability reporting by having gender-diverse boards. However, the results highlight that current corporate governance guidelines for board composition play a limited role in providing specific recommendations to the stakeholders. It is an indication that further improvements in the effectiveness of corporate boards are necessary to address the stakeholders' pressure through sustainability reporting. Table 3 reveals that the representation of independent directors on boards is 19% and 15% respectively for the leading and conventional firms in Pakistan. Therefore, SECP should ensure that the firms comply with its rule of having at least one-third of the total members of the board as an independent. The firms should also make appropriate arrangements to carry out orientation for all their directors to acquaint them with corporate social responsibility and to improve the competitive advantage through sustainability reporting.

The results advocate that ownership structure has an impact on the strategic decisions of the firm by indicating that different shareholders differ in their attitude towards sustainability engagement. Our findings present evidence that sustainability reporting can be used as leverage for attracting institutional investors, to actively invest in firms employing socially responsible practices. The regulators should also take appropriate measures to make the foreign and managerial ownership effective in driving the corporate sustainability reporting agenda in Pakistan. Moreover, the findings are of interest to policymakers for evaluating the role of the audit committee in improving the CSR disclosure practices. The empirical results suggest that audit committee size is a critical factor influencing the sustainability reporting decision of Pakistani firms. The negative association between audit committee independence and sustainability reporting decision

induces rethinking among the regulators in Pakistan and calls for fully independent audit committees.

In addition, the study suggests that large firms and older firms are more likely to issue sustainability reports. Therefore, regulators should encourage small, medium and younger firms to adopt sustainability practices. The empirical results also indicate that the firms operating in technology, chemical and pharma industries are actively engaged in sustainability reporting. It seems that the firms operating in other sectors are not facing any pressure from the stakeholders to disclose sustainability information. These findings provide useful insight to the corporate sector to meet the growing information requirements of stakeholders, manage sustainability performance, and address the social and environmental risks and opportunities.

The study acknowledges some limitations that suggest opportunities for future research. The findings of this research may not be applicable to all emerging economies since they have different investment climates, corporate structures, capital allocations, and are therefore not a homogeneous group. Moreover, it would be worthwhile to conduct a similar study in the financial sector to obtain new intuitions. The qualitative research methods may also help to do an in-depth evaluation of the effectiveness of corporate boards and audit committees in Pakistan. Despite these limitations, the results of this study present valuable insight into firms' voluntary sustainability reporting decision.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Khaled Hussainey http://orcid.org/0000-0003-3641-1031

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